

- 4 -

REMARKSCLAIM REJECTION UNDER 35 U.S.C. § 112

Claim 9, line 8 has been corrected by changing "rolls" to --roll--.

CLAIM REJECTION UNDER 35 U.S.C. § 103

Claims 9, 11 - 13, 15 and 17 are rejected under U.S.C. 103(a) as being unpatentable over Stemmler, U.S. Patent 5,022,295, in view of Kalwaites, U.S. Patent 3,881,381.

Independent claims 9 and 15 and dependent claims 11 and 17 have been amended by inclusion of "an index mechanism" in the operative heated combination of structural components for continuously passing the freshly pasted lead or lead alloy mesh strip between opposed rolls for cutting the mesh strip into paperless battery plates.

This structural and functional combination of components is not suggested or disclosed in the combination of Stemmler in view of Kalwaites.

Stemmler discloses a rotary punch for moving webs or flat individual articles of foil or paper, particularly for manufacturing hygiene products, envelopes, flat bags or the like. It is stated in col. 1, lines 45 - 68:

*" Rotary punches of this type generally operate satisfactorily under normal temperature conditions. However, problems arise if precision cuts are to be performed under varying temperature conditions. In this connection it is immaterial whether these temperature conditions are caused by the processing of hot products or by varying ambient temperatures. Because of the disparate construction of the punching device by the use of different construction materials and different mass attachments, and because of the localized heat source, different and varied temperatures result within the punch device. Different temperatures and also different construction materials cause different thermal expansions in the rotary punch. Depending on the location of the warming, this results within the*

- 5 -

*rotary punch to cutting failures or to the cutting and opposing tools hammering against one another thus resulting in increased wear of the tools and the necessity for frequent adjustment of the tool. This results finally in a considerable shorter service life of the tool. This is particularly serious if, when processing hot products, the cutting tool and the opposing tool are warmed faster and higher than the remaining parts of the rotary punch."*

The problems set forth in Stemmler due to different and varied temperatures within rotary punch devices cause differences in thermal expansion, resulting in cutting failures, or tool components hammering against one another.

It is further stated in col. 3, lines 6 – 23:

" *The above object is accomplished in accordance with the present invention by providing a method and apparatus for a rotary punch which produces profiled and straight cuts on moving webs or flat individual articles of foil or paper wherein the punching device is brought completely to a constant temperature, which is above the highest operating temperature which obtains under operating conditions, and is maintained at that temperature. The apparatus for accomplishing this method includes tempering means for the rotary punch so as to maintain constant and set the spacing of the cylindrical envelope described by the cutting edges of the cutting tool from the opposing tool. As a result of this feature the negative influence of the unchecked thermal expansion is eliminated and thus the tool service life, the operational reliability and finally also the ease of service are substantially increased."* (underlining added)

Stemmler thus provides a punching device adapted to be heated to a temperature above the highest operating temperature under operating conditions to maintain the punch components dimensionally stable so as to maintain constant the cutting arc of the cutting tool from the opposed tool for punching foil or paper.

Applicant's apparatus for continuously cutting sticky freshly pasted lead or lead

- 6 -

alloy mesh strip devoid of paper, on the other hand, comprises a cutting roll and anvil roll journaled for rotation in a supporting frame with an index mechanism and conveying means for continuously passing the freshly pasted mesh strip therebetween, with heating means for heating the cutting blades, index mechanism and opposed rolls to an operating temperature within a specified range of 160 to 300°C, preferably 180 to 210°C.

It is respectfully submitted that the device of Stemmler for punching paper and foil so thin that the device has to be heated to a temperature above its highest operating temperature to maintain dimensionally stable cutting conditions is not capable of being used with expanded, punched or cast three-dimensional unpapered mesh having its interstices filled with a sticky paste and would fail. The heating of applicant's cutting apparatus to a temperature above the highest operating temperature would be "wasteful of heat energy, require greater compensation factors for thermal expansion of the apparatus and unduly reduce the life expectancy of the die support bearings. In addition, die temperature in excess of about 210°C present a possible safety hazard in that moisture in the paste can be vaporized and expelled rapidly by 'paste spitting'. However, it may be possible to operate above 210°C to above 300°C under certain operating conditions." (applicant's specification, page 7, first paragraph)

The Stemmler reference teaches a device having tempering means adapted to operate at a temperature above its highest operating temperature. Heating means for heating applicant's apparatus above 300°C would not only waste energy but would cause undesirable thermal expansion of the apparatus and unduly reduce the life expectancy of support bearings. Also, a safety hazard could be created due to vaporization and expulsion of vaporized paste.

Further, Stemmler does not disclose an apparatus including an index mechanism and conveying means for continuously passing the mesh strip between opposed rolls and means for heating cutting blades, index mechanism, cutting roll and opposed anvil roll to a temperature within specified operating temperature range.

- 7 -

Kalwaites is cited to show it is old and well known in the art to use a workpiece conveyor and specific temperature of 160 to 300°C depending upon the type of workpiece being used with the device of Stemmler.

Kalwaites discloses a method and apparatus for manufacturing oriented net-like materials from polyolefins such as high-density polypropylene by stretching the polyolefin material at a temperature in the range of 280 to 425°F (138 to 218°C) and then by applying compressive and shearing forces to form a pattern of intersecting filaments on a forming roll after passage over a heating roll by cooling the formed material while still on the forming roll to a temperature below 240°F (116°C) for polypropylene and below 220°F (104°C) for polyethylene (col. 5, lines 4 – 16). The Kalwaites temperature ranges vary from 138 to 218°C while stretching the polyolefin material to below 116°C or 104°C depending on the polyolefin material. Thus Kalwaites not only does not teach or suggest applicant's claimed ranges of 160 to 300°C or 180 to 210°C but in distinction teaches inoperative temperatures substantially below applicant's claimed operative lower temperature limit of 160°C.

It is stated on page 7, lines 1 and 2 of the present application that, "Die temperatures in the temperature range between 80 to 150°C are not effective, as battery paste will stick to the die surfaces". Thus the Kalwaites patent teaches an inoperative lower temperature range during contact of the workpiece with the forming roll.

In that the punching device of Stemmler differs structurally and functionally from applicant's cutting apparatus and applicant's heating means are operative at different temperature ranges than disclosed in both Stemmler and Kalwaites, which teach means for heating to inoperative temperatures either above or below applicant's critical heating ranges, it is respectfully submitted that applicant's cutting apparatus is both novel and unobvious.

The Declaration by Thomas Lester Oswald previously submitted in support of a long-felt need objectively recognized a need by him while he was a self-employed

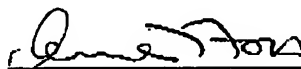
- 8 -

consultant to a purchaser of applicant's products in 1987 (Para. 7 of his Declaration), which need was persistent and not satisfied or solved by others until the present invention.

Favourable consideration and withdrawal of the Final Rejection with allowance of the amended claims are therefore respectfully submitted.

Respectfully submitted,

Marlow, et al.



Arne I. Fors  
Reg. No. 20,775

GOWLING LAFLEUR HENDRESON  
Suite 4900, Commerce Court West  
Toronto, Ontario  
Canada M5L 1J3

Telephone: (416) 862-5739

TOR\_LAW\6016780\1